

Upper Pliocene Fan 2 (UP F2) Play

Buliminella 1 biozone

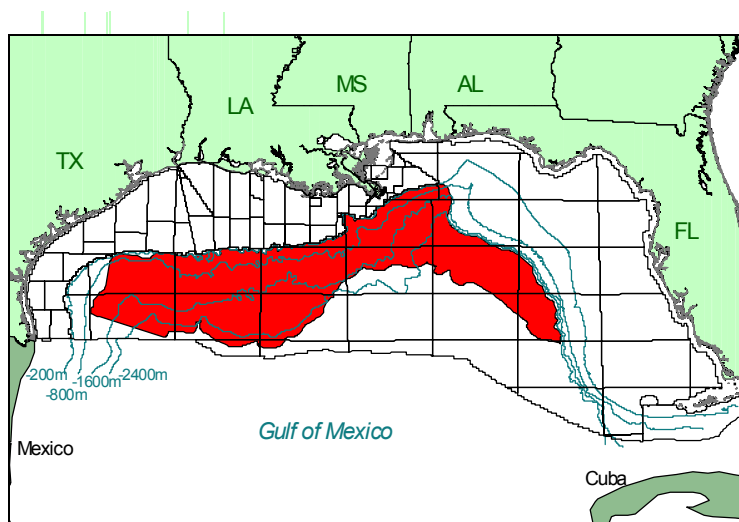


Figure 1. Play location.

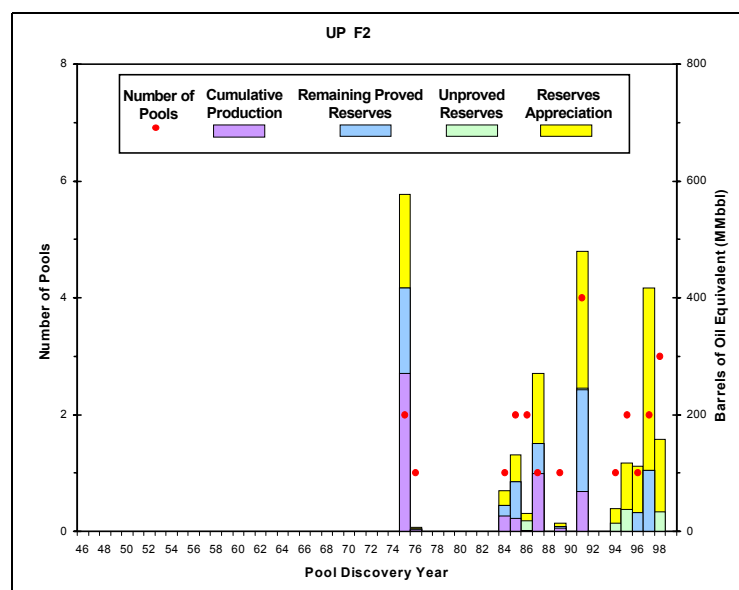


Figure 2. Exploration history graph showing reserves addition and number of pool discoveries by year.

UP F2 Play				
23 Pools 75 Sands	Minimum	Mean	Maximum	
Water depth (feet)	663	2337	4851	
Subsea depth (feet)	3700	12779	22572	
Number of sands per pool	1	3	15	
Porosity	27%	31%	36%	
Water saturation	16%	24%	37%	

Table 1. Pool attributes. Values are volume-weighted averages of individual reservoir attributes.

Play Description

The established Upper Pliocene Fan 2 (UP F2) play is the second largest play in the Gulf of Mexico Region on the basis of both BOE mean total endowment and undiscovered conventionally recoverable resources (UCRR). The play occurs within the *Buliminella* 1 biozone and is defined by deep-sea fan sediments in a structural regime of allochthonous salt sheets and canopies with intervening salt-withdrawal basins located on the modern Gulf of Mexico Region slope. The play extends from the East Breaks and Alaminos Canyon Areas offshore Texas to the southwestern Destin Dome and western Desoto Canyon Areas east of the present-day Mississippi River Delta, and southeast to The Elbow and Vernon Areas of offshore Florida (figure 1).

Updip, the UP F2 play is limited by the Upper Pliocene Fan 1 (UP F1) play. The UP F2 play does not extend farther to the west because of a lack of sediment influx at the edge of the UP depocenter. To the east, the play onlaps the Cretaceous carbonate slope. Downdip in the western and central Gulf of Mexico Regions, the UP F2 play is limited by the farther downdip occurrence of either (1) the Sigsbee Salt Canopy Escarpment, where the farthest extent of large salt bodies overrides the abyssal plain, or (2) the downdip limit of the Perdido Fold Belt and Mississippi Fan Fold Belt plays. Downdip in the eastern Gulf Region, the play is limited by the southern extent of Louann Salt deposition, as defined by the downdip extent of the Upper Cretaceous to Upper Jurassic Salt Roller/High-Relief Salt Structure (UK5-UJ4 S1) play.

Play Characteristics

Component depositional facies include channel/levee com-

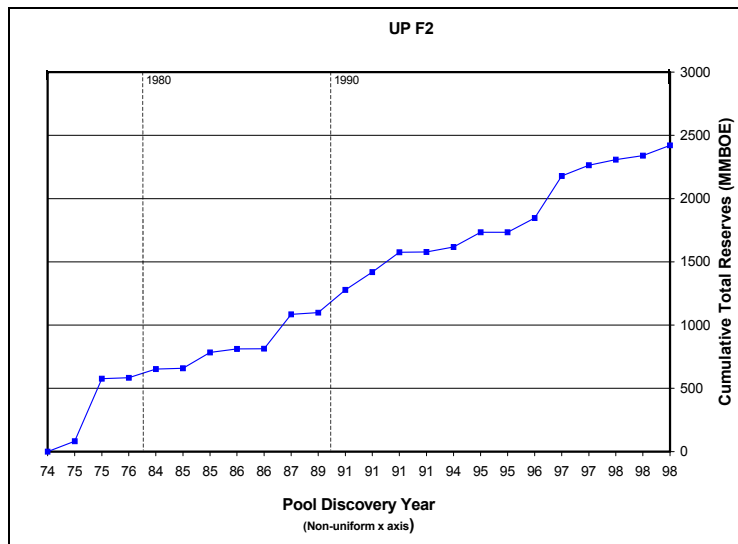


Figure 3. Plot of pools showing cumulative reserves by discovery order. Note the non-uniform x axis.

UP F2 Play Marginal Probability = 1.00	Number of Pools	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)
Reserves				
Original proved	15	0.750	1.925	1.092
Cumulative production	—	0.321	0.971	0.494
Remaining proved	—	0.429	0.953	0.599
Unproved	8	0.081	0.132	0.104
Appreciation (P & U)	—	0.919	1.713	1.224
Undiscovered Conventionally Recoverable Resources				
95th percentile	—	2.737	8.546	4.354
Mean	127	3.128	10.848	5.058
5th percentile	—	3.578	14.358	6.032
Total Endowment				
95th percentile	—	4.487	12.315	6.775
Mean	150	4.878	14.617	7.479
5th percentile	—	5.328	18.127	8.453

Table 2. Assessment results for reserves, undiscovered conventionally recoverable resources, and total endowment.

plexes, sheet-sand lobes, interlobes, lobe fringes, and slumps deposited on the UP upper and lower slope, in topographically low areas between salt structure highs and on the abyssal plain. These deep-sea fan systems are often overlain by thick shale intervals representative of zones of sand bypass on the shelf, or sand-poor zones on the slope.

Over half of the fields in the UP F2 play are structurally associated with salt bodies with hydrocarbons trapped on salt flanks or in sediments draped over salt. Some fields contain hydrocarbon accumulations trapped by permeability barriers, updip pinchouts, or facies changes. Seals are provided by the juxtaposition of reservoir sands with shales and salt, either structurally (e.g., faulting, diapirism) or stratigraphically (e.g., lateral shale-outs, overlying shales).

Discoveries

The UP F2 mixed oil and gas play contains total reserves of 1.750 Bbo and 3.769 Tcfg (2.421 BBOE), of which 0.321 Bbo and 0.971 Tcfg (0.494 BBOE) have been produced. The play contains 75 producible sands in 23 pools, of which 15 contain proved reserves (table 1; refer to the Methodology section for a discussion of reservoirs, sands, and pools). The first reserves in the play were discovered in 1975 in the Mississippi Canyon 148 and Mississippi Canyon 194 (Cognac) fields (figure 2). Maximum yearly total reserves of 577 MMBOE were also added in 1975, as was the largest pool in the play, Cognac, with an estimated 495 MMBOE in total reserves (figures 2 and 3). Eighty-six percent of the play's cumulative production and 45 percent of the play's total reserves were from pools discovered before 1990. The most recent discoveries, prior to this study's cutoff date of January 1, 1999, were in 1998.

The 23 discovered pools contain 118 reservoirs, of which 32 are nonassociated gas, 74 are undersaturated oil, and 12 are saturated

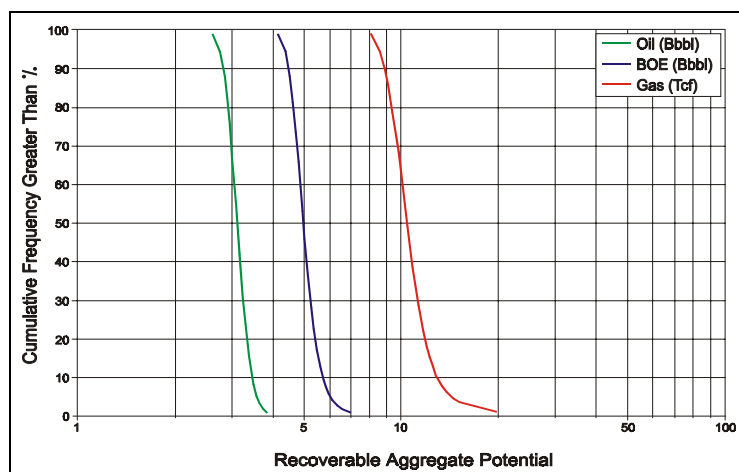


Figure 4. Cumulative probability distribution for undiscovered conventionally recoverable resources.

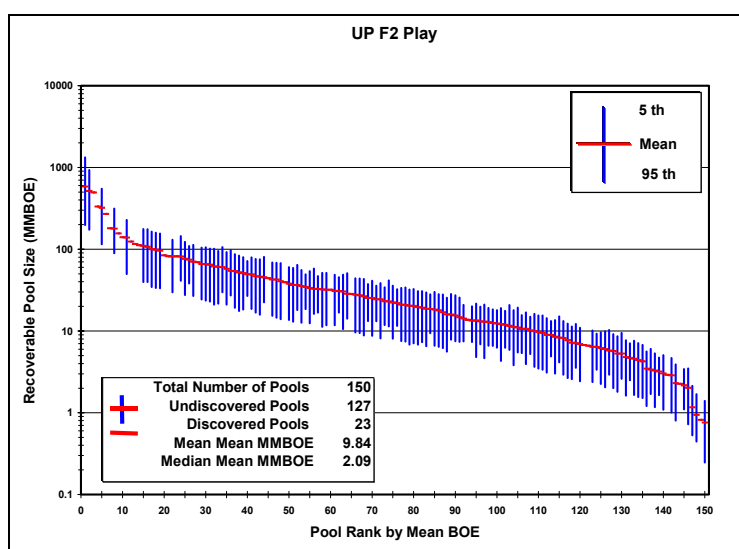


Figure 5. Pool rank plot showing the number of discovered pools (red lines) and the number of pools forecast as remaining to be discovered (blue bars).

oil. Cumulative production has consisted of 65 percent oil and 35 percent gas.

Assessment Results

The marginal probability of hydrocarbons for the UP F2 play is 1.00. This play is the second largest in the Gulf of Mexico Region on the basis of a mean total endowment of 4.878 Bbo and 14.617 Tcfg (7.479 BBOE) (table 2). Seven percent of this BOE mean total endowment has been produced.

The UP F2 play is also the second largest play in the Gulf of Mexico Region on the basis of BOE mean UCRR. Assessment results indicate that UCRR have a range of 2.737 to 3.578 Bbo and 8.546 to 14.358 Tcfg at the 95th and 5th percentiles, respectively (figure 4). Mean UCRR are estimated at 3.128 Bbo and 10.848 Tcfg (5.058 BBOE). Of the 13 fan 2 plays, the UP F2 play contains the largest BOE mean total endowment and the most UCRR. These undiscovered resources might occur in as many as 127 pools. The largest undiscovered pool, with a mean size of 585 MMBOE, is also forecast to be the largest pool in the play (figure 5). The forecast places the next four undiscovered pools in positions 2, 5, 8, and 11 on the pool rank plot. For all the undiscovered pools in the UP F2 play, the mean mean size is 40 MMBOE, which is smaller than the 105 MMBOE mean size of the discovered pools. The mean mean size for all pools, including both discovered and undiscovered, is 50 MMBOE.

BOE mean UCRR contribute 68 percent to the play's BOE mean total endowment. The UP F2 play covers a vast area with relatively few well penetrations. With over 5 BBOE forecast to be discovered and eight undiscovered pools forecast to each contain over 100 MMBOE in total reserves, the likelihood of future significant discoveries is thought to be high. The UP section is very thick in the Garden Banks and Green Canyon Areas, and probably to the south

of these areas as well. Exploration potential exists around salt stocks in deep structural and stratigraphic traps as well as in structures located below salt overhangs and sheets.